

Winter Weather Spotter Training

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Your presenter



Tony Edwards

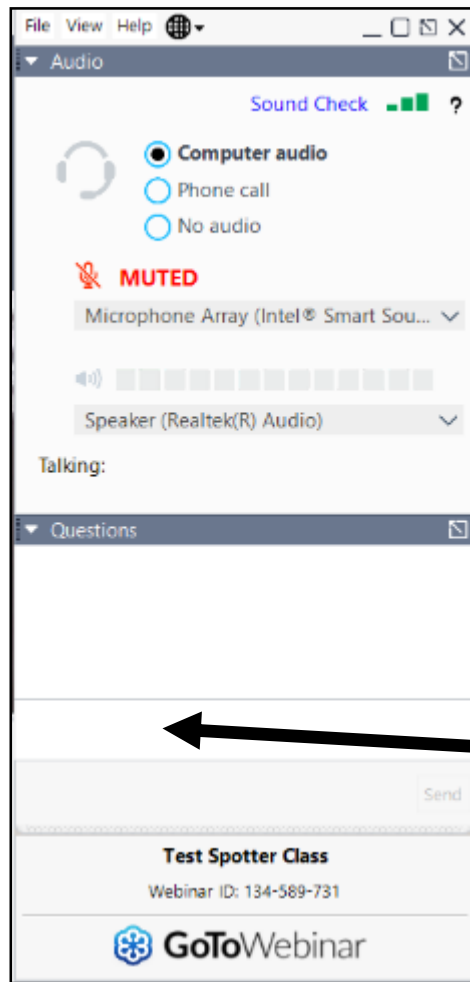
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Warning Coordination Meteorologist: Serves as the principal interface between the Weather Forecast Office and the users of it's products and services in leading the effort to insure their evaluation, adjustment, and improvement.

Using GoToWebinar

You can change your audio settings and ask us questions throughout the presentation from your control panel.




If you can't hear me, you might need to check your audio settings.

Sometimes, the easiest thing to do is just dial in using the phone.

Click "Phone Call" here and dial in using the number provided.

If you have a question at anytime during the webinar, type your question in here and we will answer it at the end of the webinar.



If your control panel has minimized, it'll be on the far right side of your screen. Click on the to the  to expand the control panel.

Your Observations of Snow and Ice are EXTREMELY Important to Us!

Here's what we do with your observations:

- Adjust our forecast as needed.
- Send the reports out to the media and the world (Local Storm Reports).
 - Your report may help change someone's plans (and save lives!).
- Use them for verification purposes so we know how good/bad our forecasts were.
- Include them in post event summaries which are used by state and local Emergency Management and even FEMA.



Winter Weather Spotter Training



- Just how bad can winter get around here?
 - Snow climatology
 - Extreme winter storms and cold temperatures
 - Winter safety



- How to Properly Observe and Report Winter Weather
 - What to report
 - Properly measuring snow and ice
 - How to send us your reports



- Forecasting Winter Weather
 - Why is it so hard to forecast winter storms?
 - Finding winter weather forecasts



- NOAA Winter Outlook and What It Means for Our Region



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Lessons from the Past

"The farther backward you can look, the farther forward you are likely to see."

Winston Churchill

We can look back at our weather history and get a good understanding of the weather threats we should be prepared for.

Weather records in our region date back to the late 1800s and early 1900s. That history is full of floods, severe thunderstorms, tornadoes and crippling winter storms!

Natural Hazard Risk Assessment

Weather.gov > Charleston, WV > Natural Hazard Risk Assessment

[Current Hazards](#)
[Current Conditions](#)
[Radar](#)
[Forecasts](#)
[Streams and Lakes](#)
[Climate and Past Weather](#)
[Local Programs](#)

Severe weather preparedness takes **awareness**, **planning** and then **action**. You can't effectively take action in an imminent hazardous weather event unless you have some sort of plan in place, and you can't develop a robust hazardous weather plan unless you understand the threats you may face.

Here's where history can help us...

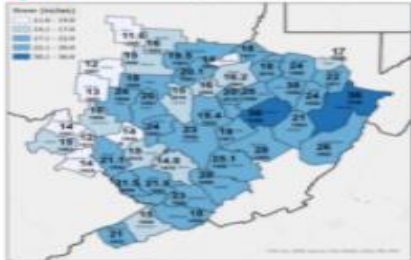
"The farther backward you can look, the farther forward you are likely to see."

Winston Churchill

As the Churchill quote directs, we can look back at our history and get a good understanding of the weather threats we should be prepared for. Weather records in our region date back to the late 1800s and early 1900s and that history is full of floods, severe thunderstorms, tornadoes and crippling winter storms. The resources below are meant to help document and quantify some of these threats in order to help inform the planning stage of severe weather preparedness.

[Floods/Flash Floods](#)
[Tstorms/Tornadoes](#)
[Heat Extremes](#)
[Winter Extremes](#)
[Tropical Systems](#)

Record One-Day Snowfall




Snowfall Extremes

Snowstorms, while not frequent, have paralyzed our region for days and caused major hardships on the population. In fact, the Great Appalachian Storm of November 1950, which is responsible for many of the one-day snowfall records illustrated on this map, persisted for several days and is responsible for the West Virginia state record 3-day snow total of 57.2" from Coeburn Creek in Harrison County.

- Additional county based snowfall record information can be obtained from the National Centers for Environmental Information [Snowfall Extremes](#) webpage.

Coldest Temperature Observed



Historical Cold Snaps

The coldest temperature observed at observing stations in each county is indicated, along with the year it was set.

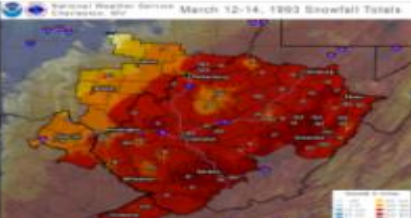
Observation periods vary by county depending on when stations were established. This makes comparing records from county to county difficult. For instance, one county may have had a station established during the arctic outbreak of February 1899, while an adjacent county may not have had an active station at that time. However, comparing the data in totality provides a good approximation of the coldest temperatures observed in our region since the late 1800s.

Some notable cold spells that stick out from the map include February 1899, January 1912, January 1963, January 1965, January 1994, and February 2015.

- [Coldest Temperatures on Record by County \(pdf\)](#) - Find out the coldest temperature on record for your county and when and where it was set. Source: Midwest Regional Climate Center

Top Ten Snowstorms on Record

We have provided detailed information, including snowfall maps and a detailed meteorological analysis of the top 10 snow storms since 1950 for each official climate site in the NWS Charleston, WV County Warning Area. Also included for each station is a composite surface low chart for the top 10 snow storms for that station. [Read More...](#)

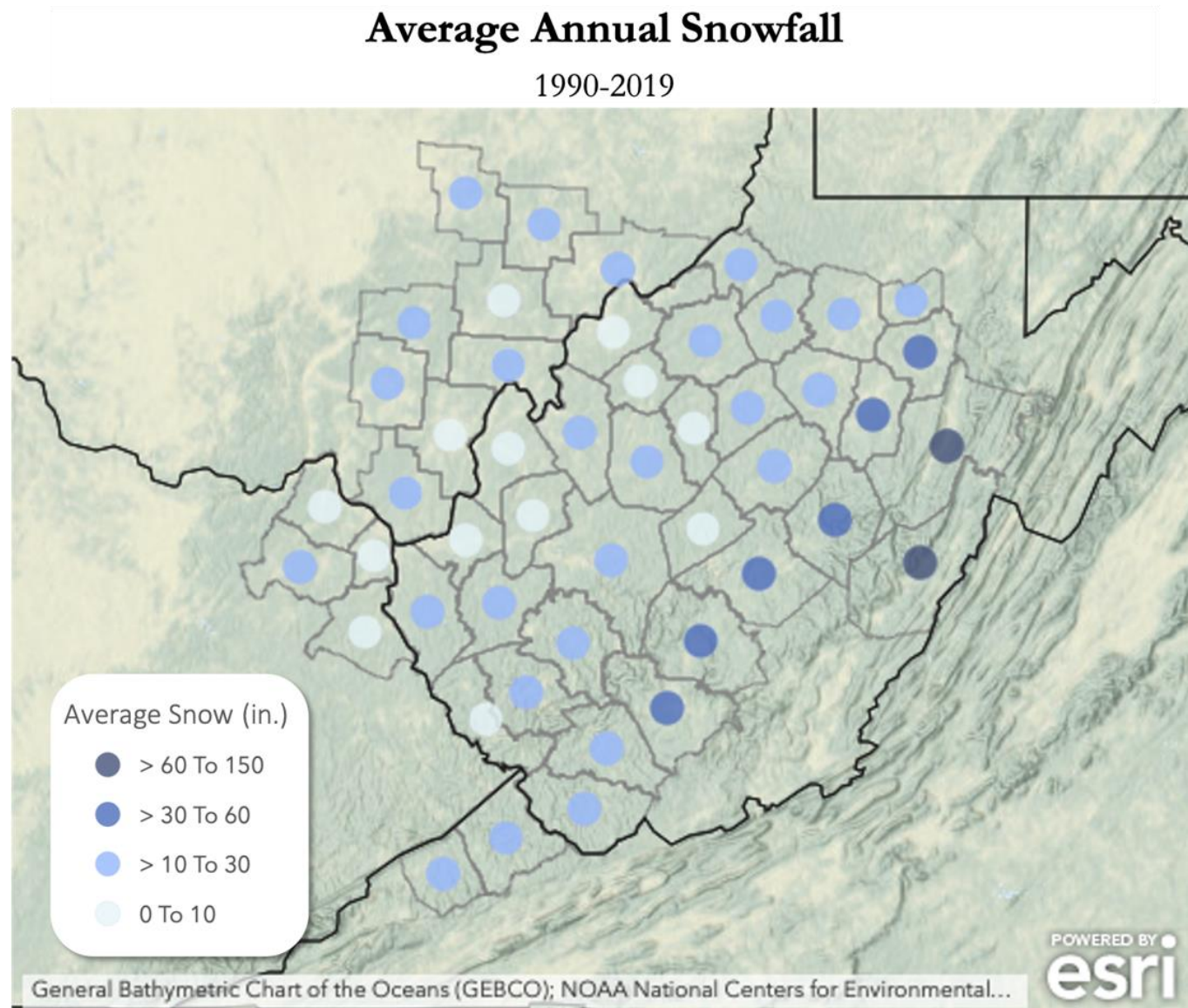


www.weather.gov/rhx/HazardRiskAssessment

How Much Snow is Normal?

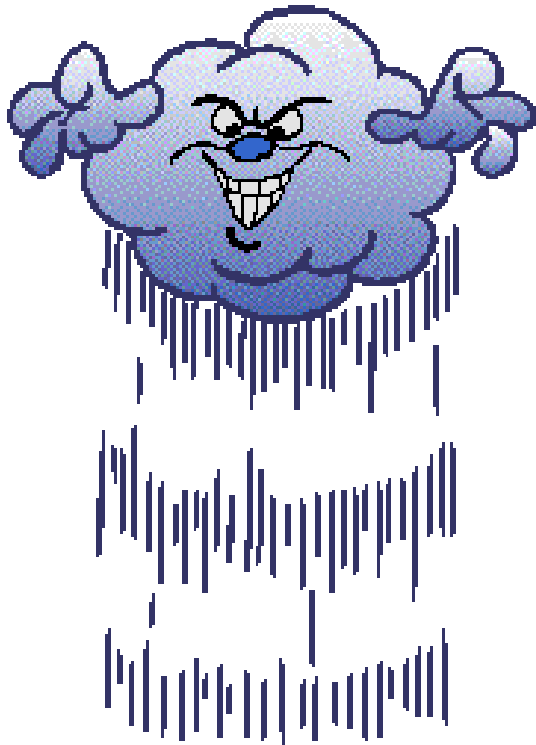
Average annual snowfall amounts vary considerably across our region.

- Grundy, VA- 16.0"
- Athens, OH- 17.6"
- Huntington- 19.8"
- Charleston- 31.5"
- Beckley- 55.9"
- Elkins- 68.9"
- Snowshoe- 144.7"



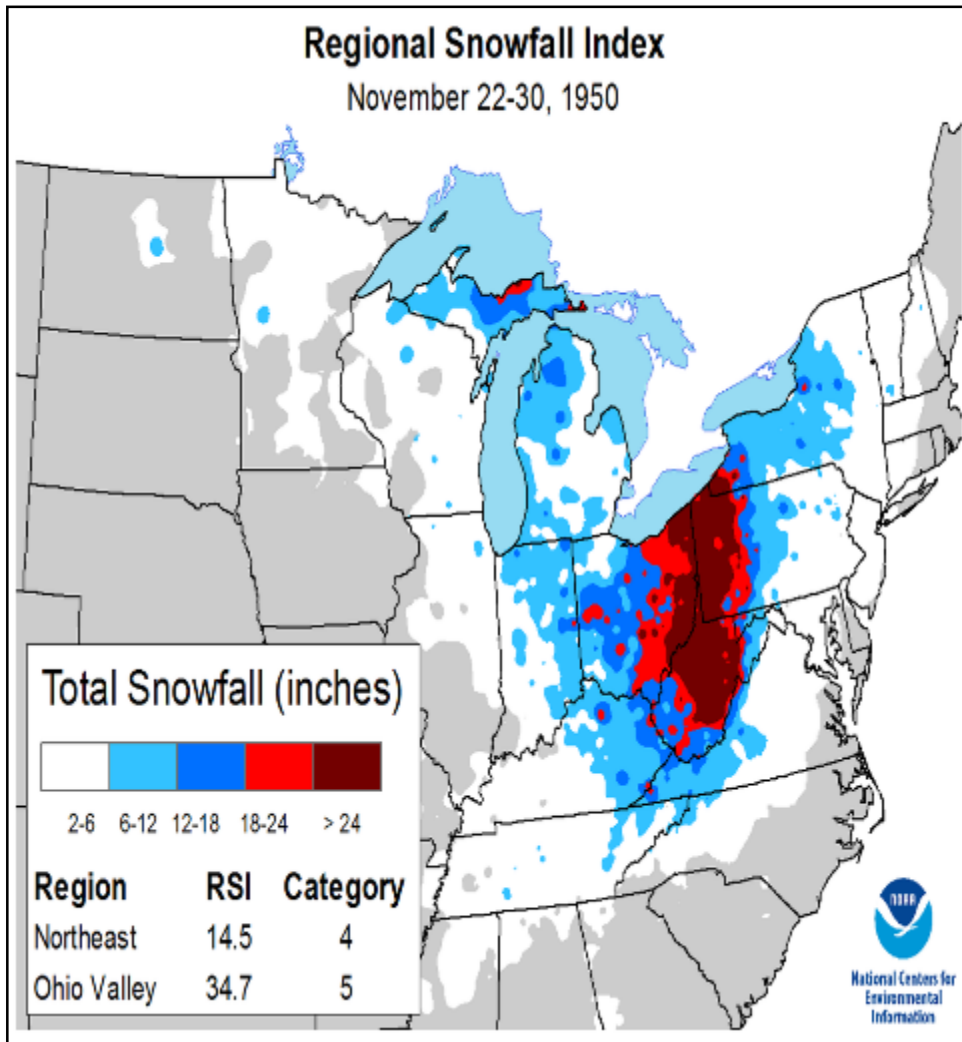
Lessons from the Past

WV Emergency & Disaster Declarations by Hazard since 1954



Severe storms/flooding/landslides....	42
Flooding....	11
Winter Storms/Flooding/Blizzard....	8
Hurricane (including Sandy)....	4
Drought....	2
Chemical Spill....	1

Great Appalachian Storm of November 1950



- Coburn Creek – 62"
- Pickens – 57"
- Clarksburg – 38"
- Parkersburg – 34.6"
- Morgantown – 31.3"
- Charleston – 25.7"
- Winds over 30 mph with temperatures in the single digits

160 Deaths!

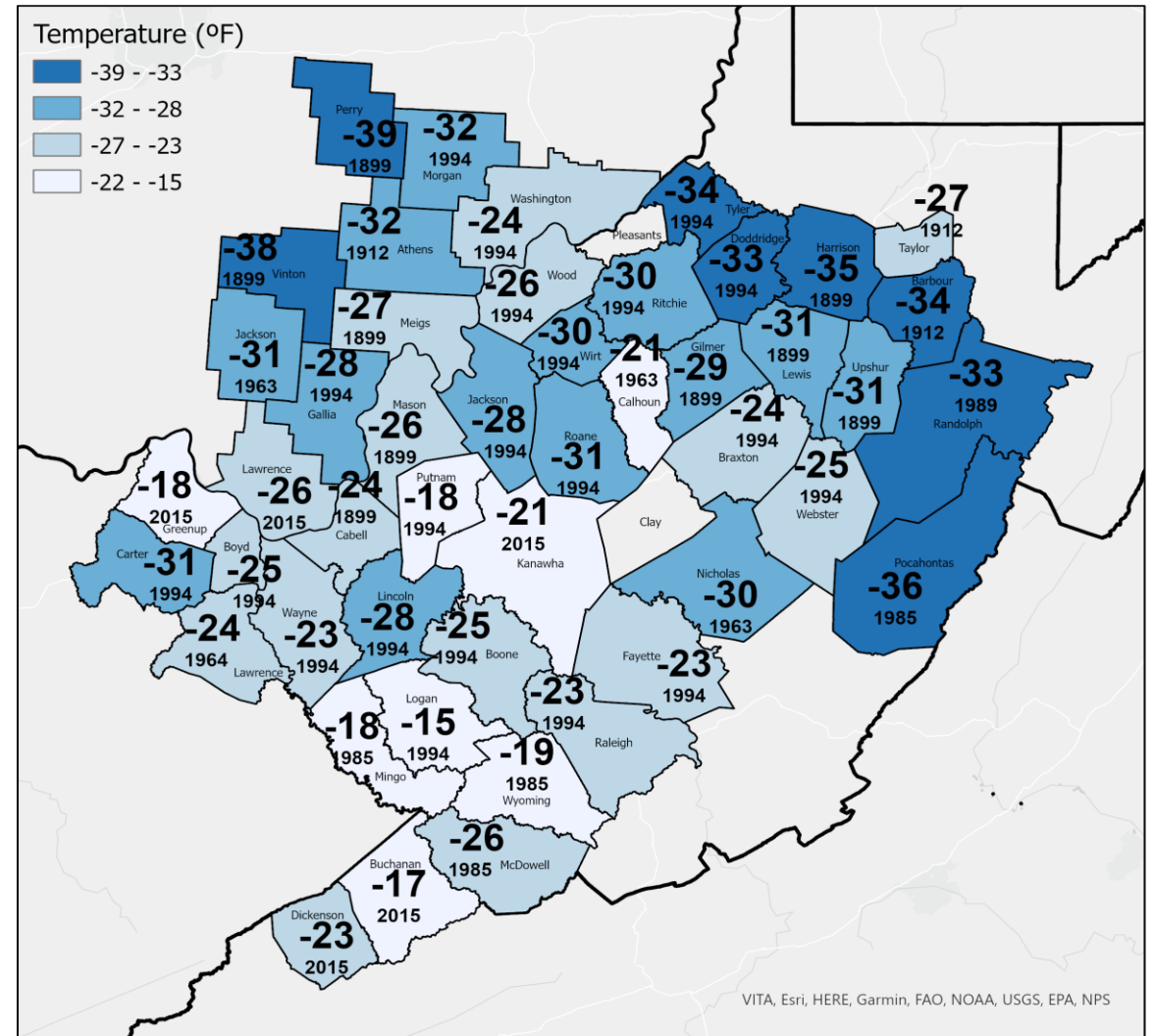
Lessons from the Past - Winter

How Cold Can It Get in WV?

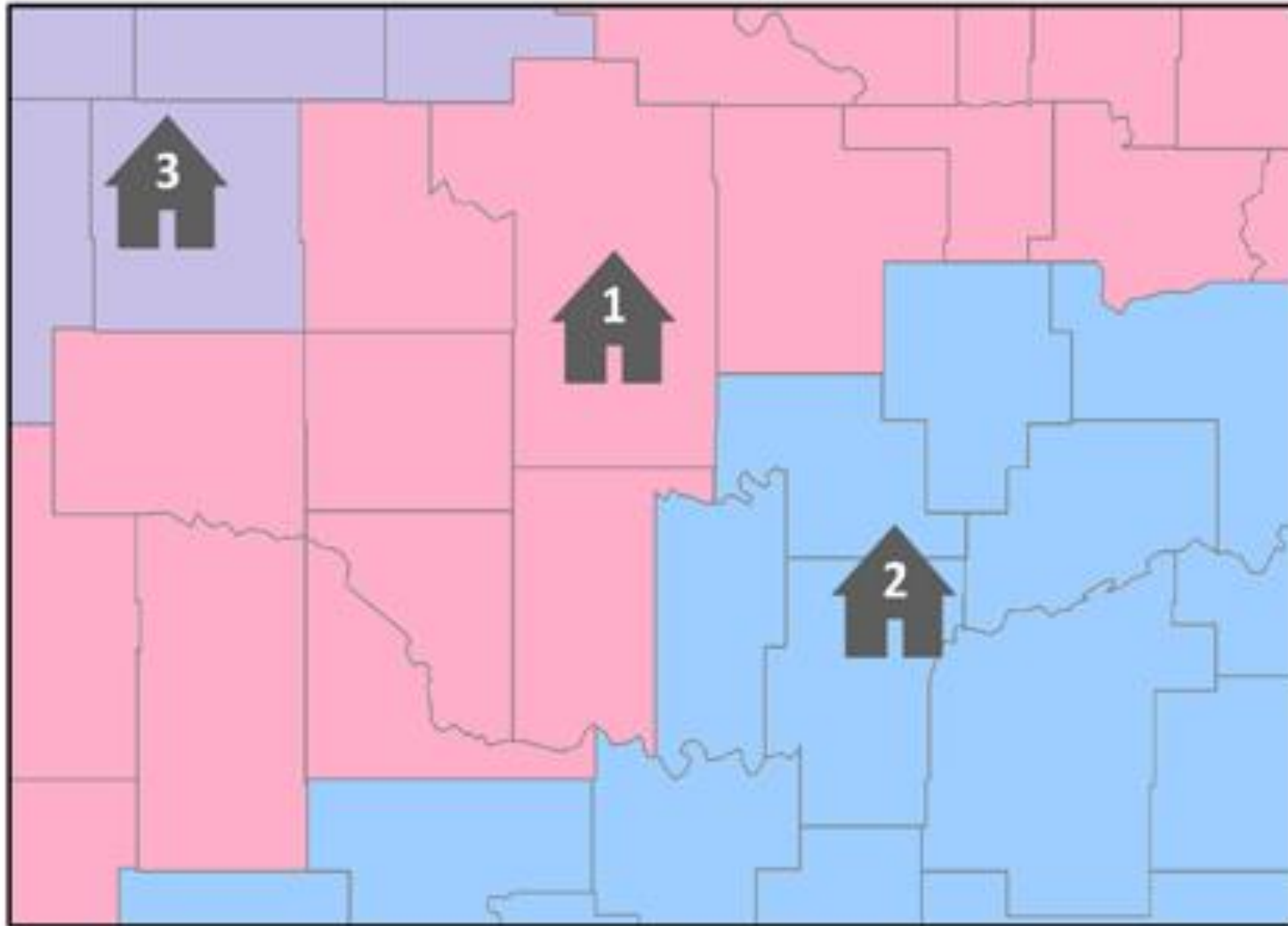
- Most of the region has experienced temperatures as cold as 20 to 30 below zero with several counties dropping 30 to 40 below zero.
- The coldest temperature observed in our region was -39°F at Milligan, OH (Perry County) on February 10, 1899.
- Other notable cold spells include:
 - January 1912- 34 below in Barbour Co, WV
 - January 1963- 30 below in Nicholas Co, WV
 - January 1985- 26 below in McDowell Co, WV
 - January 1994- 31 below in Carter Co, KY
 - February 2015- 23 below in Dickenson Co, VA



Coldest Temperature Observed



Know the Terminology



Winter Storm Products

Winter Storm Warning

Snow, sleet, or ice expected! Take Action! Confidence is high that a winter storm will produce heavy snow, sleet or freezing rain and cause significant impacts.

Winter Storm Watch

Snow, sleet, or ice possible! Be prepared. Confidence is medium that a winter storm could produce heavy snow, sleet, or freezing rain and cause significant impacts.

Winter Weather Advisory

Wintry weather expected. Exercise caution. Light amounts of wintry precipitation or patchy blowing snow will cause slick conditions and could affect travel if precautions are not taken.

Winter Weather Safety

The #1 Best Thing You Can Do To Be Prepared – Build a Kit!

- **Water**, one gallon of water per person per day for at least three days
- **Food & medicine/prescriptions**, at least a three-day supply
- **Radio**, battery-powered or hand crank radio and a NOAA Weather Radio with tone alert and extra batteries for both
- **Flashlight and extra batteries**
- **First aid kit**
- **Whistle** to signal for help
- **Face mask** to help filter contaminated air and plastic sheeting and duct tape to shelter-in-place
- **Moist towelettes**, garbage bags and plastic ties for personal sanitation
- **Wrench or pliers** to turn off utilities
- **Manual can opener** for food
- **Local maps**
- **Cell phone** with chargers, inverter or solar charger



Winter Weather Safety

Don't Forget Your Car!



Winter Weather Safety

Winter Road Trip Safety



- Each year, more than 5,000 people are killed and more than 418,000 injured due to weather-related vehicle crashes.
- TAKE IT SLOW IN THE SNOW!
- If temperatures are near freezing, drive like you're on ice – you may be!
- Check the forecast and road conditions on the route between your home and your destination.

SNOW SQUALLS

- Intense bursts of snow and wind
- Short duration
- Whiteout visibility
- Rapidly deteriorating road conditions

National Weather Service **SNOW SQUALL WARNINGS**

- Issued when a snow squall is occurring or imminent
- Typically in effect for 30-60 minutes in a small, targeted area
- Can trigger a Wireless Emergency Alert to your phone
- When issued, slow down or delay travel

weather.gov



Other Considerations!



- Hypothermia occurs when your body temperature drops below 96°F.
- If you or someone you know shows the above signs of hypothermia, get medical attention immediately.



- Inspect/clean your chimney
- Test out your backup generators, make sure they will start.
- Keep generators away from homes and garages

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What to Report



*** Snow, Sleet and Freezing Rain Amounts ***

✓ Intermediate reports during the storm and one final total at the end

- **Any Occurrence of Freezing Rain**
- **Changing Precipitation Types**
 - Rain – Freezing Rain – Snow – Etc

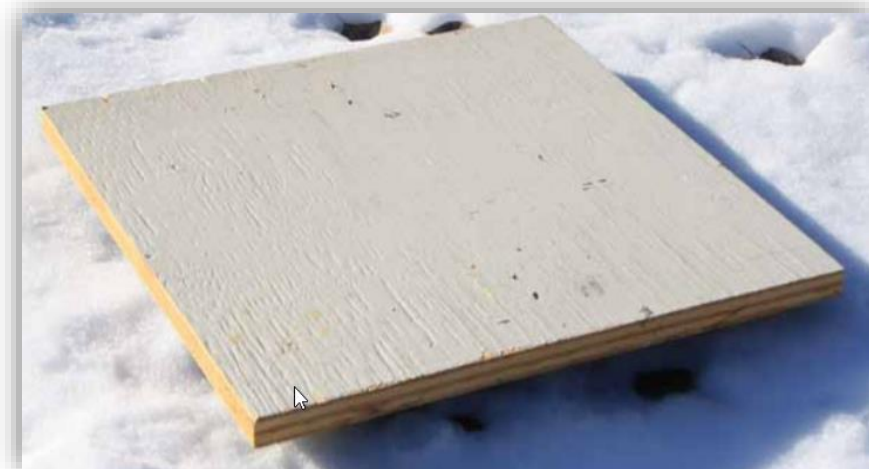
Report Precip
Type Easily Using
mPing App!



How to Properly Measure Snow & Ice

Supplies

- **Snow measuring board, or a flat surface like a picnic table or porch railing**
 - Place the snow board on a flat surface away from trees or other obstructions.
 - Mark it with a flag so you know where it is under the snow.
 - Do not measure on grass as it will artificially inflate the total.
 - Two snow boards are great – one for new snow and one left undisturbed for snow depth measurements



- **Ruler or yard stick**
 - We typically prefer measurement in 1/10ths of an inch, but if you don't have a ruler that measures in those increments, just give us the fractional measurement and we'll convert it for you.

How to Properly Measure Snow & Ice

Taking Your Measurements

- **New Snow** (measured in 1/10ths of an inch)
 - Accumulation of new snow since the storm began or since you took your last measurement.
 - Don't include any old snow that may be hanging around.
 - Measure new snowfall as soon as possible after it ends, before settling and melting can occur.
- **Snow Depth** (measured in inches)
 - Average depth of snow on the ground, including any previous snow that may be hanging around from previous storms.
 - If the snow depth is not uniform, take several measurements and average them together.



How to Properly Measure Snow & Ice

What About Ice?

For spotter reports, we'll take either FLAT ICE or RADIAL ICE ACCUMULATION but just let us know how you took the measurement.

$$\text{Flat Ice} = \text{Radial Ice} / 0.4$$

Taking a Radial Ice Accumulation Measurement



- Use a ruler to measure the thickness of ice on a branch.
- Often ice varies in thickness on the top and bottom of the branch. Measure both thicknesses and get the average thickness for your report.
- Top 3/10 inch | Bottom 1/10 inch
Average 2/10 inch

Taking a Flat Ice Accumulation Measurement



- Measure from top of flat surface such as a metal post or porch railing.
- Chip into the ice down to the surface and measure the accumulation of ice from the top of the surface.
- Example from pic: **1/2 inch**

Sending Us Your Reports

How to Report

There are a variety of ways to report weather to the NWS office in Charleston, WV. By using the methods below, your severe weather reports will reach forecasters in real time. Please be sure to include the location of the weather event, e.g. 5 miles northwest of Charleston. You may also indicate if you are a trained spotter, a ham radio operator, a member of law enforcement, or other affiliation if applicable.

- Submit Report**
Use this Web Based Form: [Submit Report](#)
- Spotter Hotline**
Trained weather spotters can report significant weather conditions by calling the toll-free spotter hotline given to them as part of their training.
- Facebook**
Post information on our Facebook page: <https://www.facebook.com/NWSCharlestonWV>
- Twitter**
Send us a tweet: [@NWSCharlestonWV](#)
- Email**
Send us an email: rlx.ops@noaa.gov
- Mobile App**
Send reports from your location via a smartphone app: [MPing](#)


What to Report

Reporting the following phenomena when they occur help us warn others!

Tornado Damaging Winds Hail Flooding Heavy Rain **Snow** Freezing Rain/Icing Strong Winds Fog

Snow Info

- How much snow fell (to nearest tenth of an inch if possible), e.g. 3.5".
- What period of time did the snow fall? (e.g. 1 hour 15 minutes.)
- Was the snowfall measurement estimated or measured?
- For more information on how to properly measure snow, visit <https://media.cocorahs.org/docs/MeasuringSnow2.1.pdf>.




The infographic titled "Six Basic Steps for Properly MEASURING SNOW" provides a guide for accurate snowfall measurements. It includes steps for setting up equipment, measuring snow, and reporting the data. The steps are: 1. Supplies (use a yardstick, 14" x 14" white board, flag), 2. Planning (find an open area away from tall objects, but sheltered from wind), 3. Set-up (set up before snow begins, put your board and mark it with the flag), 4. Measuring Snow (measure once daily at the same time, after measuring once the board is top of snow), 5. When Snow Stops (measure as soon as the snow stops to avoid lower totals due to melting, settling and drifting), and 6. Reporting (use NOAA.gov, social media, or email to send your report).

- Please send us reports by looking for the icon on you local NWS office website.
- You can report using the following platforms:
 - [Web Based Form](#)
 - Spotter Hotline given out to trained spotters
 - [Facebook \(NWSCharlestonWV\)](#)
 - [Twitter \(@NWSCharlestonWV\)](#)
 - Email us at rlx.ops@noaa.gov
 - [Mping mobile app](#)




View Reports


Most reports we receive are transmitted as Local Storm Reports and can be viewed at the following locations. Many reports are also stored in the official [NOAA Storm Events](#) database.



Local Storm Reports



Rainfall Reports (CoCoRaHS)



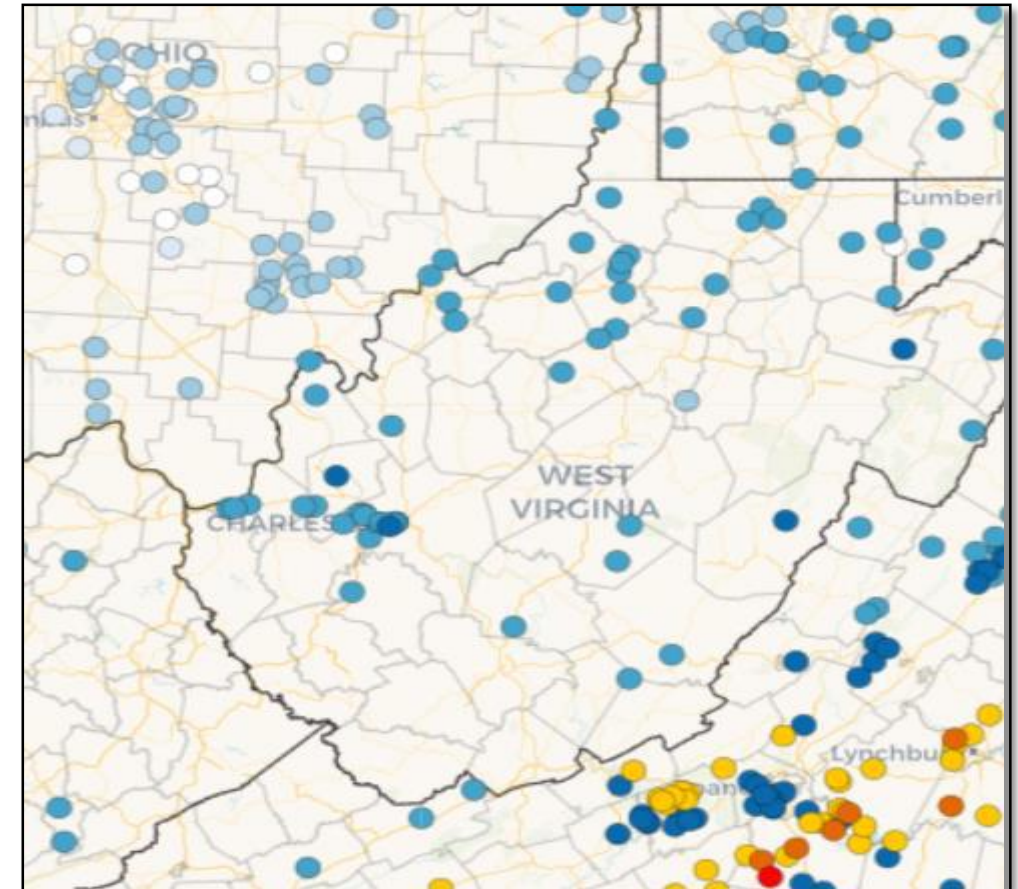
Snowfall Reports

<https://www.weather.gov/rlx/reports>

CoCoRaHS – Rainfall and Snowfall Reporting

https://www.weather.gov/rlx/cocorahs_observers

- The Community Collaborative Rain, Hail and Snow Network (CoCoRaHS) is a volunteer network of weather observers working together to measure and map precipitation in their local communities.
- Can be individuals but also fire departments, water plants, DOH garages, etc. There's also a program tailored to schools with lesson plans and teaching aids.
- It is very important to have “trained” observers in your county for FEMA Disaster Declarations for winter storms!
- Help us fill in the gaps on the map at the right by signing up today!



Winter Weather Spotter Training



- Just how bad can winter get around here?
 - Snow climatology
 - Extreme winter storms and cold temperatures
 - Winter safety



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 - What to report
 - Properly measuring snow and ice
 - How to send us your reports



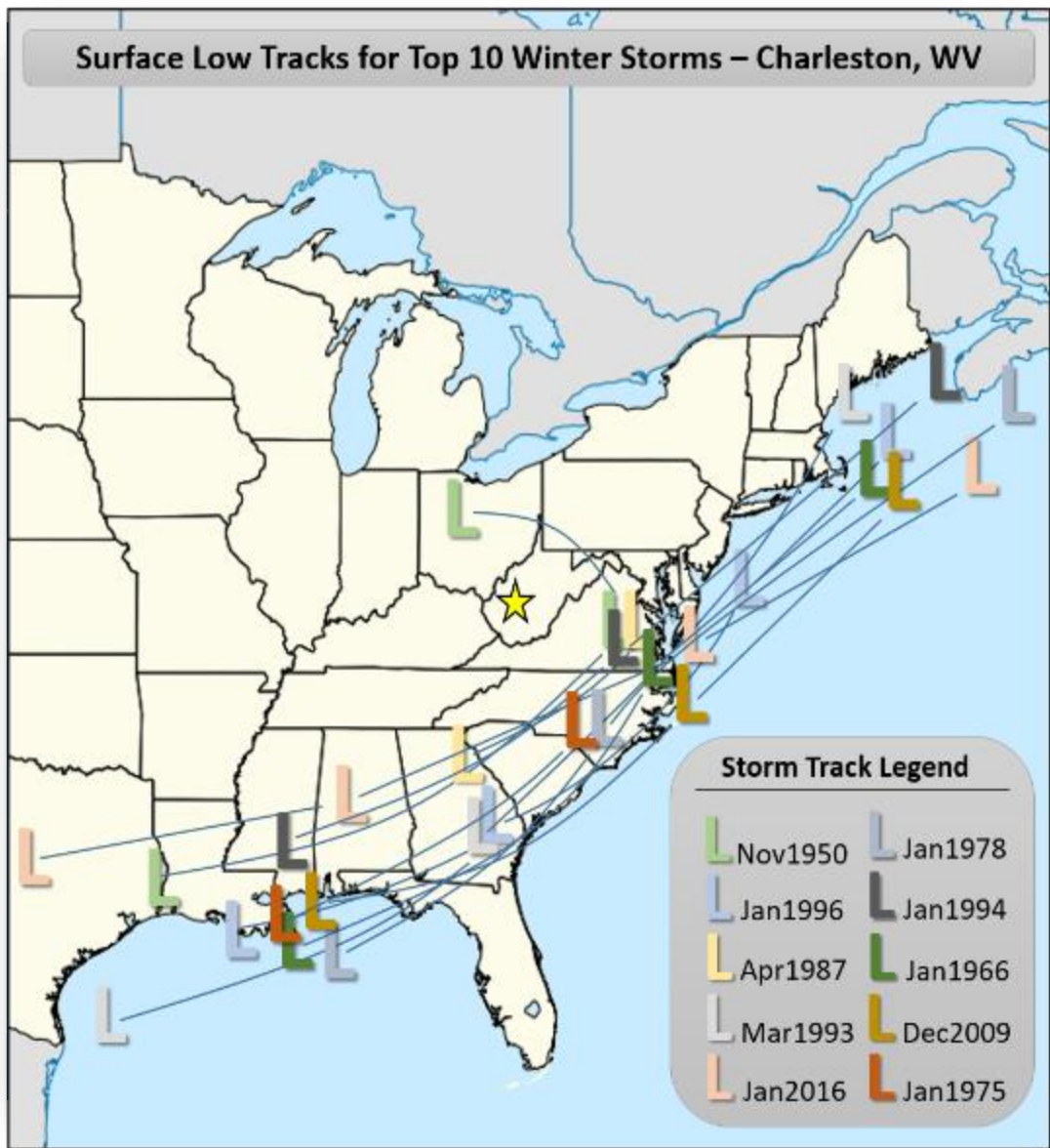
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Forecasting Winter Storms



Three key ingredients:

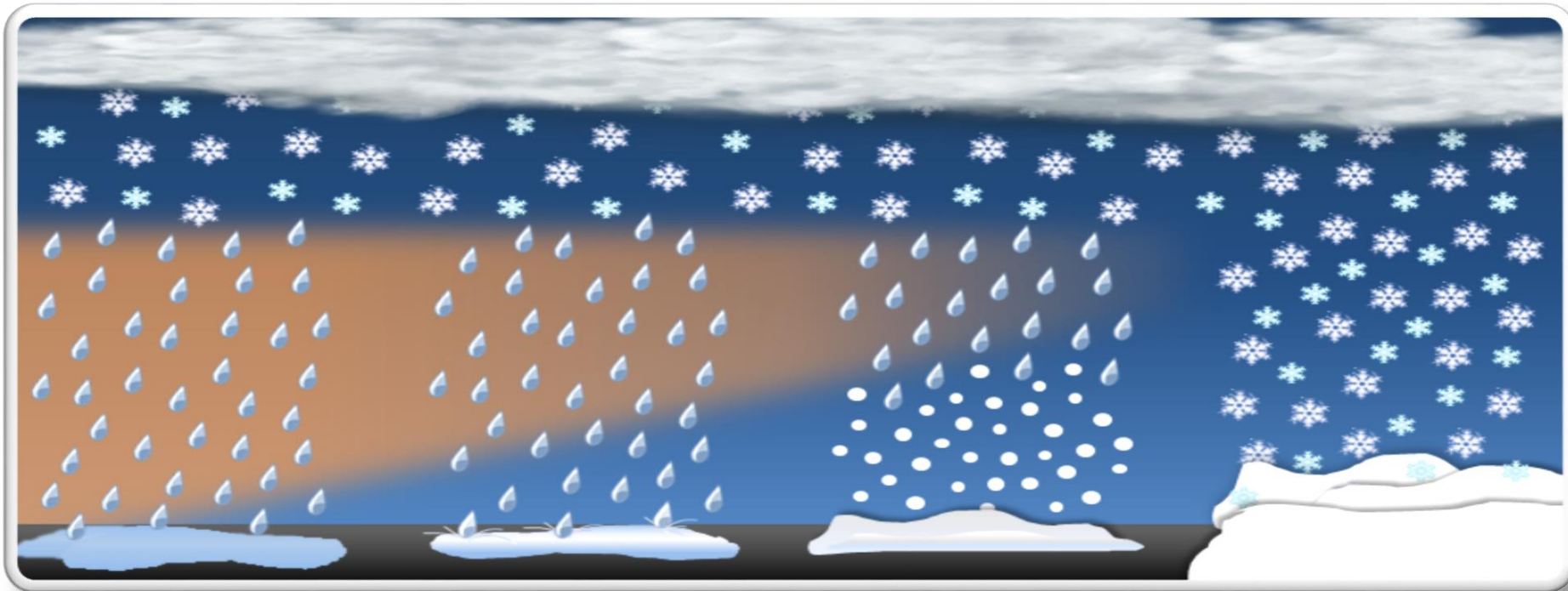
Cold Air: For snow and ice to form, the air must be below freezing in the clouds and near the ground.

Moisture: Sources are large bodies of water, such as the Pacific Ocean and Gulf of Mexico.

Lift: Lift causes moisture to rise and form clouds and precipitation.

Surface low track is very important for determining "who gets what"

Forecasting Winter Storms



Snow falls out of clouds into cold air aloft and...

...melts to rain in a deep layer of warm air that extends down to the surface.

...melts to rain in a warm layer aloft, then freezes into glaze ice upon contact with cold surfaces.

...melts in a warm layer aloft, then refreezes into ice pellets in a layer of cold air above the surface.

...remains snow in the absence of any warm layer of air aloft.

1 or 2 degrees 5,000 feet above the ground may mean the difference between a foot of snow, or 1" of cold rain (and a bunch of unhappy school kids/teachers).

Winter Forecast Page Updates




NATIONAL WEATHER SERVICE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

HOME FORECAST PAST WEATHER SAFETY INFORMATION EDUCATION NEWS SEARCH ABOUT

Local forecast by "City, ST or ZIP code"
Enter location: Go
[Location Help](#)

News Headlines

- [Simplification of NWS Flood Products starting on Nov 4th](#)
- [Latest Hazardous Weather Outlook and Weather Briefing](#)
- [Past News Headlines and Web Articles](#)

NWS Forecast Office Charleston, WV
[Weather.gov](#) > Charleston, WV

Charleston, WV
Weather Forecast Office

[Current Hazards](#) [Current Conditions](#) [Radar](#) [Forecasts](#) [Rivers and Lakes](#) [Climate and Past Weather](#) [Local Programs](#)

Click a location below for detailed forecast.

[Watches, Warnings & Advisories](#)
[Hazardous Weather Outlook](#)

MY FORECAST
Charleston, Yeager Airport WV

A Few Clouds
67°F
19°C [Get Detailed Info](#)

This Afternoon
Sunny
High: 68°F

Tonight
Partly Cloudy
Low: 45°F

[change location](#)

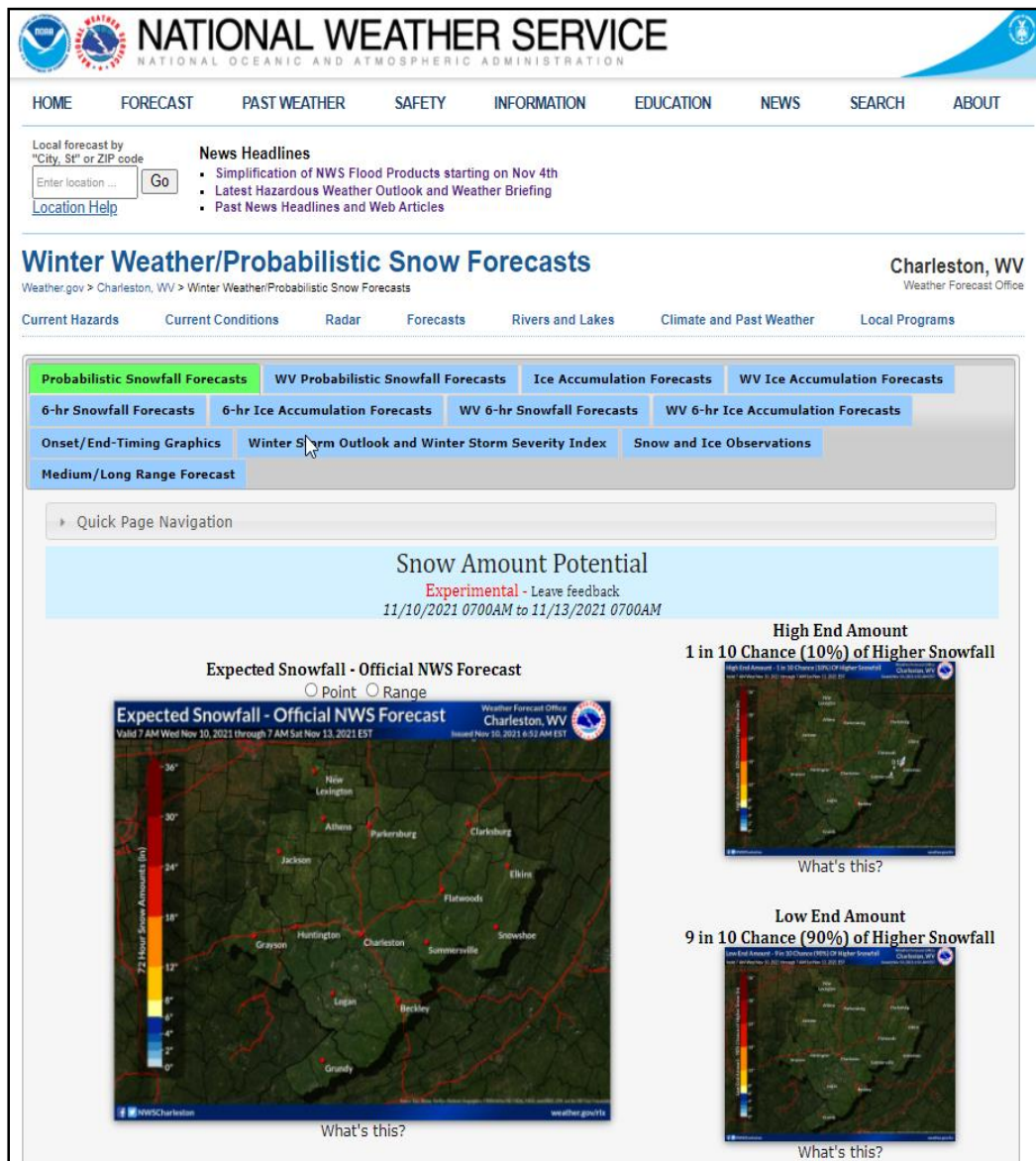
Weather Story **Local Radar** **Satellite**

Text Product Selector (Selected product opens in new window)
Latest Text Products Issued by RLX

[Radar](#) [Current Weather](#) [Rivers & Lakes](#) [Satellite](#) [Forecast Maps](#) [Hour by Hour Forecast](#)
[Winter Weather](#) [Graphical Hazards](#) [Weather Hazard Briefing](#) [Forecaster's Discussion](#) [Text Bulletins](#) [Climate Plots](#)

- Comprehensive winter weather forecast information can be found by looking for the icon on you local NWS office's webpage.
- Winter weather information for the NWS Charleston, WV forecast area and statewide graphics for West Virginia can be found at www.weather.gov/rlx/winter

Winter Forecast Page Updates

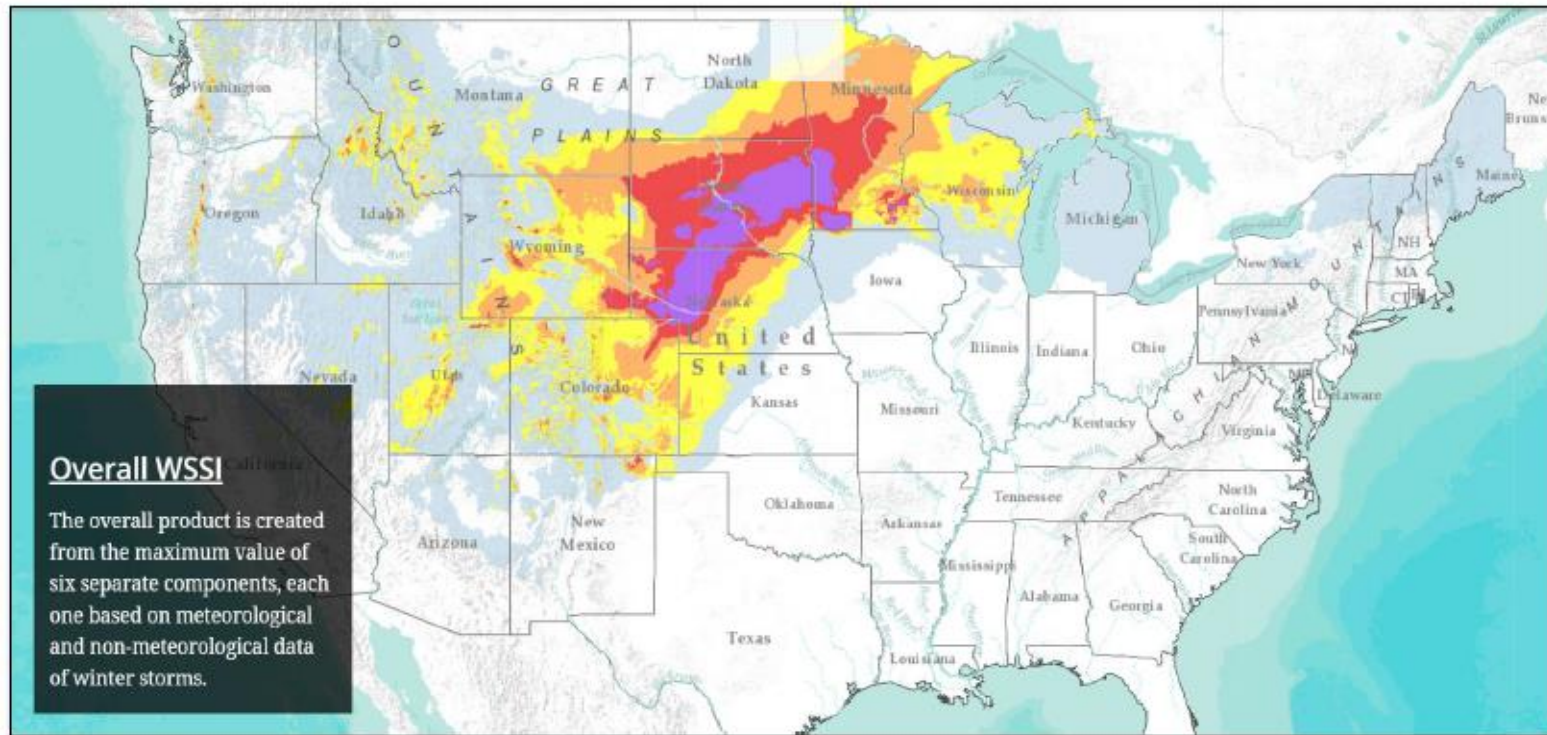


- These pages contain a vast array of winter storm related forecast information including amounts, potential extremes, timing and impacts.
- Menu/tabs have been streamlined so they are the same no matter which NWS office you are looking at.
- Graphics packages are new this year
- Statewide graphics for snow and ice accumulation are available!
 - WV- www.weather.gov/rlx/winter
 - OH- www.weather.gov/iln/winter
 - KY- www.weather.gov/lmk/winter
 - VA- www.weather.gov/akq/winter

Winter Storm Severity Index

www.wpc.ncep.noaa.gov/wwd/wssi/wssi.php?id=RLX

- Provides winter storm impact information out to 72 hours, with a new Experimental Day 4 and new 6-hour visualization option.
- Includes meteorological and non-meteorological factors
 - Snow Load (weight of snow)
 - Snow Amount
 - Ice Accumulation
 - Ground Blizzard
 - Flash Freeze (during and after precipitation)
 - Blowing Snow



Potential Winter Storm Impacts	
	No Impacts Impacts not expected.
	Limited Impacts Rarely a direct threat to life and property. Typically results in little inconveniences.
	Minor Impacts Rarely a direct threat to life and property. Typically results in an inconvenience to daily life.
	Moderate Impacts Often threatening to life and property, some damage unavoidable. Typically results in disruptions to daily life.
	Major Impacts Extensive property damage likely, life saving actions needed. Will likely result in major disruptions to daily life.
	Extreme Impacts Extensive and widespread severe property damage, life saving actions will be needed. Results in extreme disruptions to daily life.

Graphical Hazardous Weather Outlook



- Revamped Graphical Hazardous Weather Outlook can be found by looking for the icon on you local NWS office's webpage.

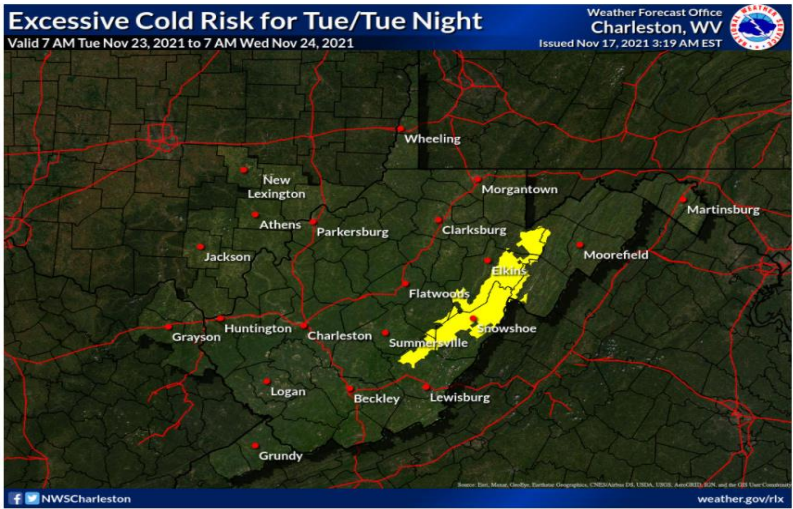


- Or go to www.weather.gov/erh/ghwo?wfo=rlx

Graphical Hazardous Weather Outlook

Experimental Graphical Hazardous Weather Outlook

Select Zoom Area: WV ▾



24 Hr Hazard Risks	Today	Thu	Fri	Sat	Sun	Mon	Tue
Severe Thunderstorm	■	■	■	■	■	■	■
Tornado	■	■					
Thunderstorm Wind	■	■					
Hail	■	■					
Lightning	■	■	■	■	■	■	■
Excessive Rainfall	■	■	■				
Wind	■	■	■	■	■	■	■
Fog	■	■	■	■			
Fire Weather	■	■	■	■	■	■	■
Excessive Cold	■	■	■	■	■	■	■
Ice Accumulation	■	■	■	■	■	■	■
Snow/Sleet	■	■	■	■	■	■	■

- Quick way to get briefed on what weather hazards are in the forecast over the next week
- Change the hazard graphic map by clicking on the “chicklet” icon in the hazard matrix.
- Includes statewide graphics by changing the “Select Zoom Area” dropdown
 - WV- www.weather.gov/erh/ghwo?wfo=rlx
 - OH- www.weather.gov/erh/ghwo?wfo=iln
 - VA- not available yet
 - KY- not available yet
- More mobile friendly architecture.

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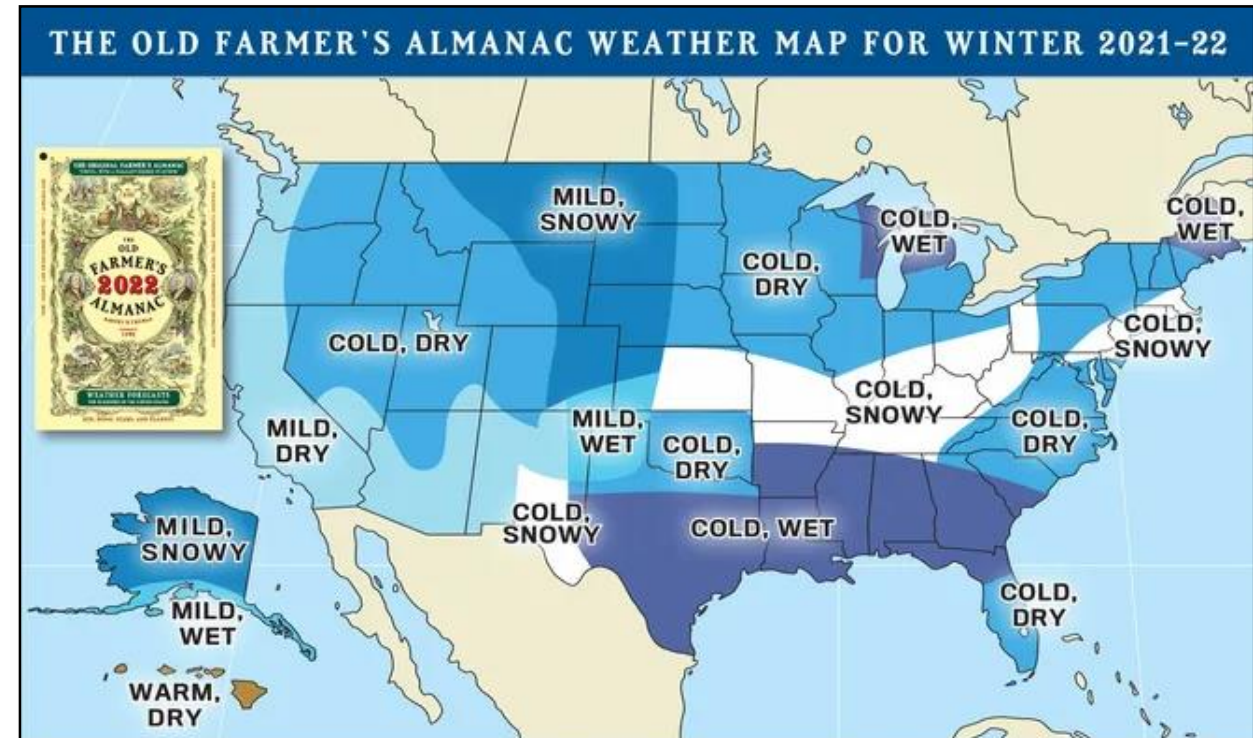
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- **NOAA Winter Outlook and What It Means for Our Region**

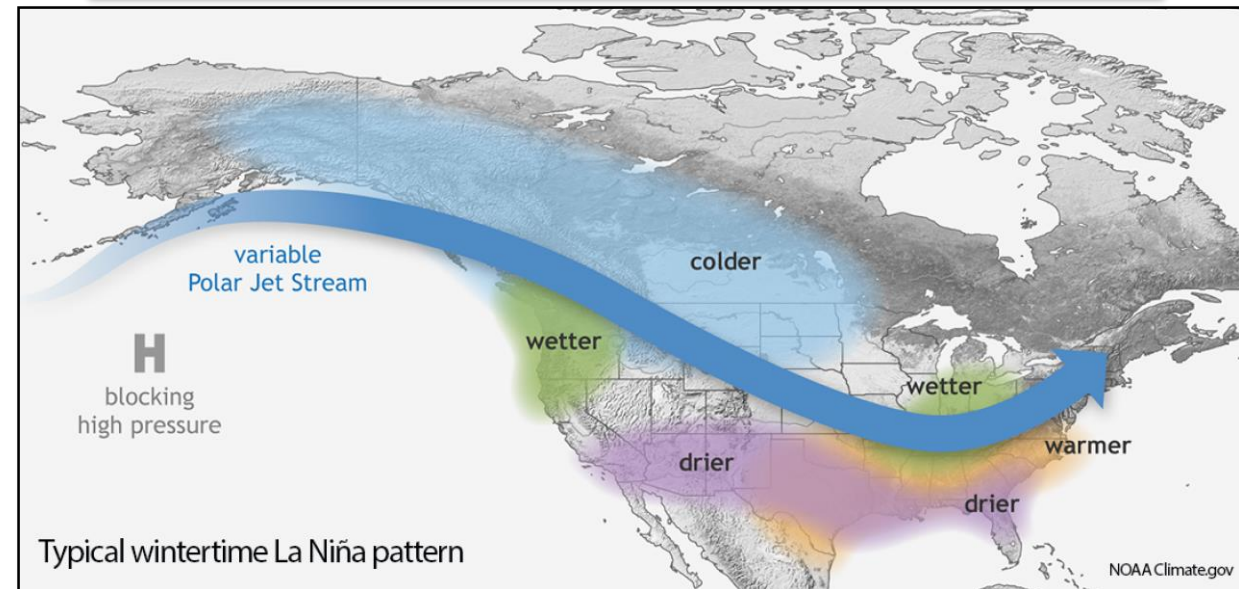
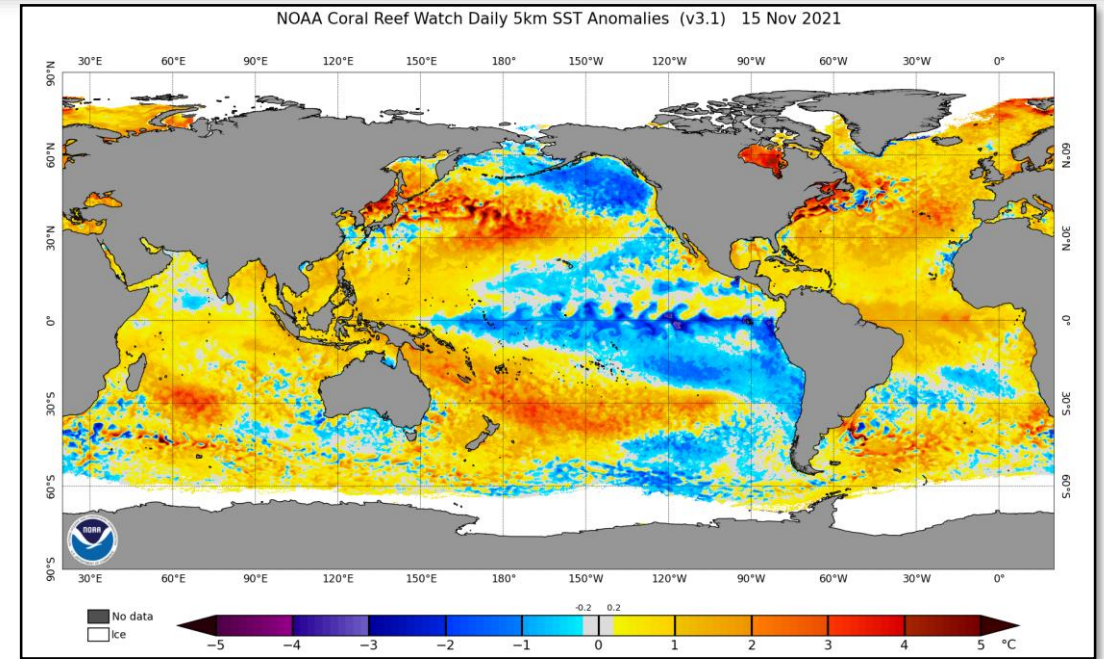


NOAA Winter 2021/22 Outlook



NOAA Winter 2021/22 Outlook

- La Nina is a pattern of abnormally cool water temperatures in the central Pacific Ocean which has long reaching impacts on the weather across the Northern Hemisphere.
- A moderate La Nina is forecast this winter.
- A typical La Nina winter features a storm track that favors a wetter than normal winter across the Ohio Valley with warmer than normal temperatures over the Mid-Atlantic and Southeast United States.
- La Nina was the main influence on our weather pattern last winter as well.



Winter 2021

Precipitation Outlook



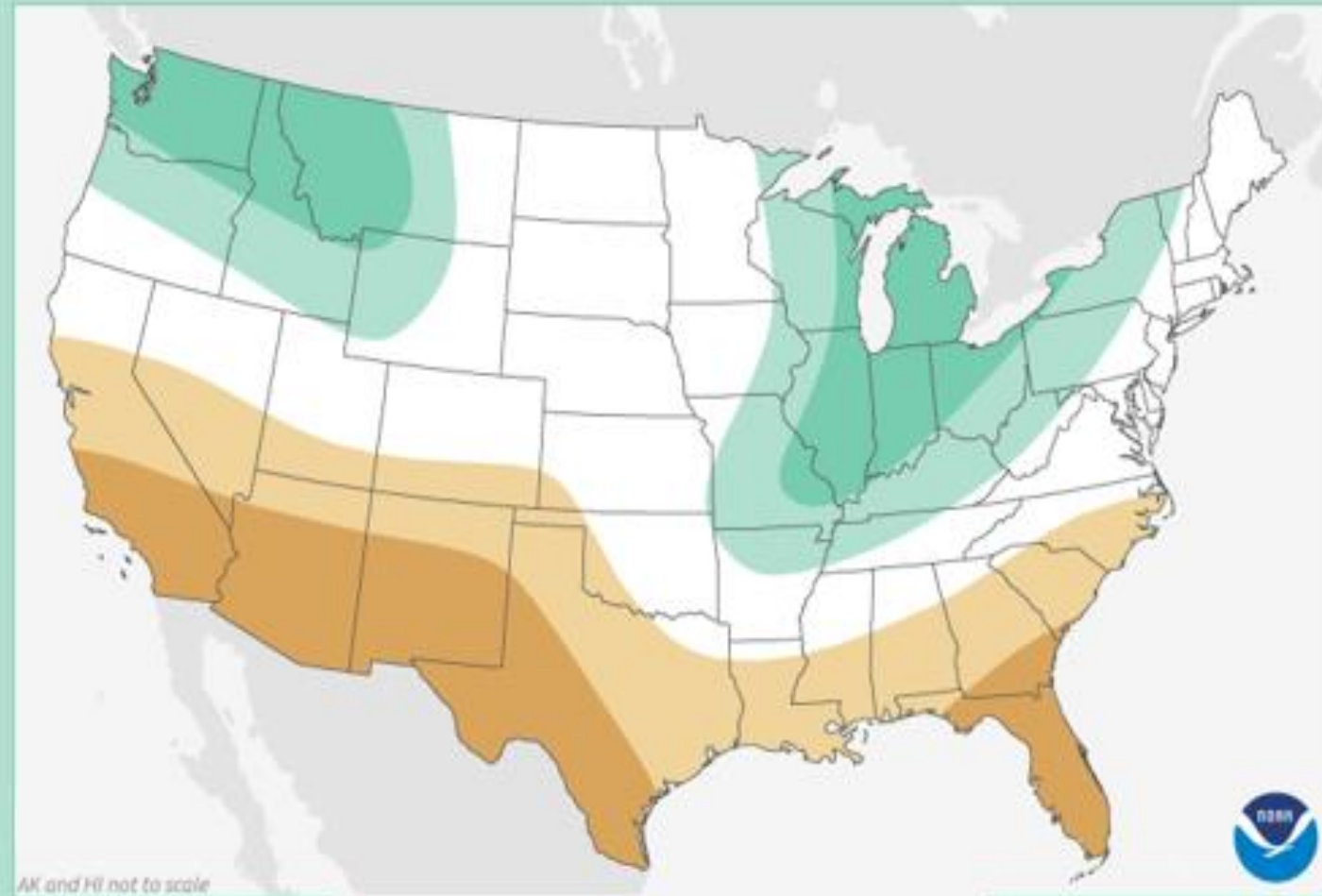
OHIO VALLEY:

PORTIONS OF THE OHIO VALLEY WILL HAVE THE GREATEST CHANCES FOR WETTER THAN AVERAGE CONDITIONS

ELSEWHERE:

DRIER THAN AVERAGE CONDITIONS ARE FAVORED IN SOUTHERN CALIFORNIA, THE SOUTHWEST, AND THE SOUTHEAST

THE FORECAST FOR THE REMAINDER OF THE U.S. SHOWS EQUAL CHANCES FOR BELOW- NEAR- OR ABOVE AVERAGE PRECIPITATION DURING THE



AK and HI not to scale



Winter 2021

Temperature Outlook



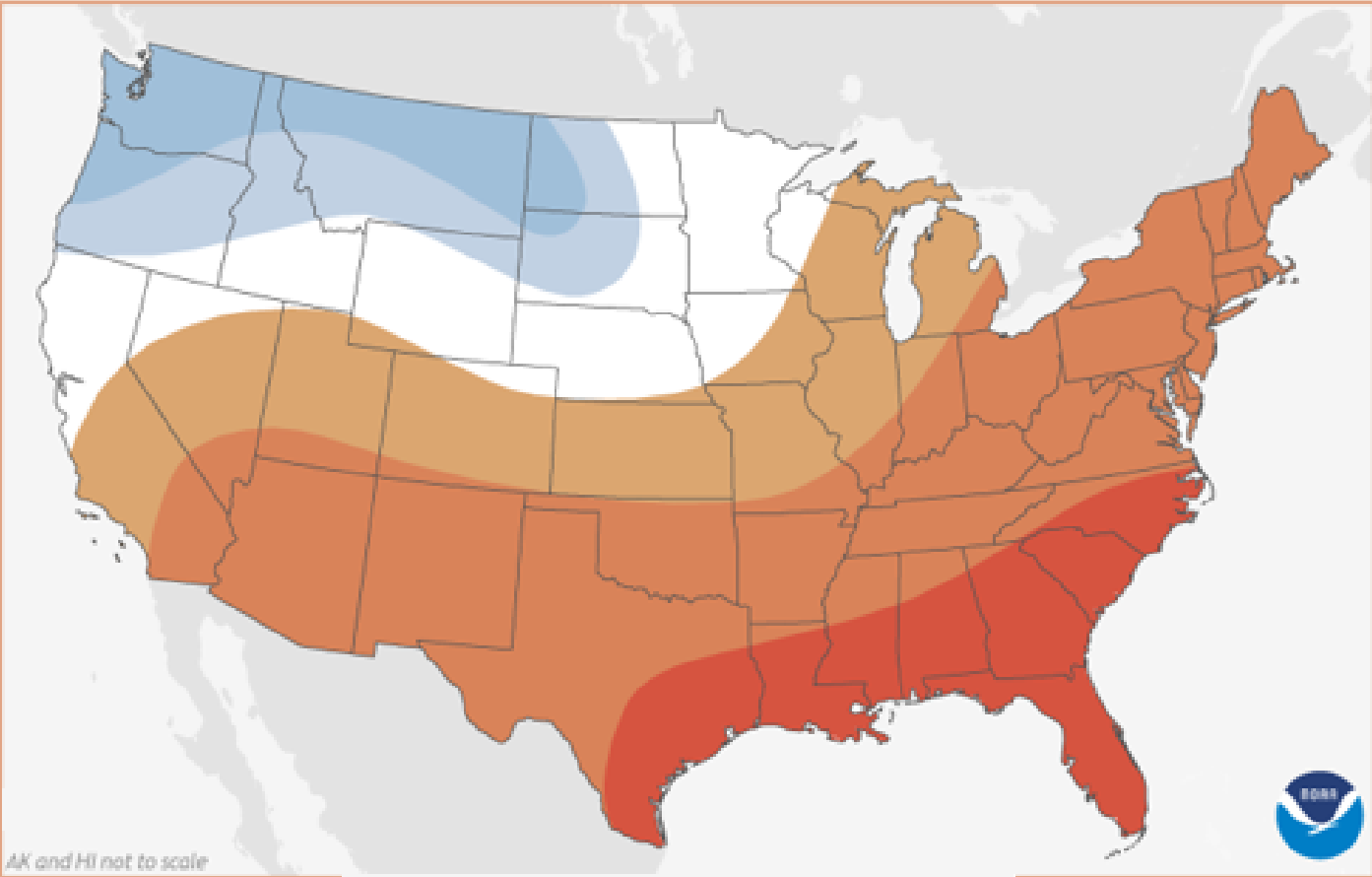
OHIO VALLEY:

THE OHIO VALLEY WILL MOST LIKELY SEE ABOVE NORMAL TEMPERATURES THIS WINTER

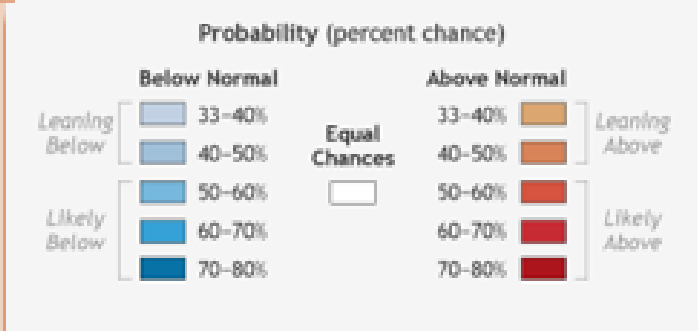
ELSEWHERE:

BELOW AVERAGE TEMPERATURES ARE FAVORED FOR SOUTHEAST ALASKA AND THE PACIFIC NORTHWEST INTO THE NORTHERN PLAINS

WARMER THAN AVERAGE CONDITIONS ARE MOST LIKELY ACROSS THE SOUTHERN TIER OF THE U.S. AND MUCH OF THE EASTERN U.S.



AK and HI not to scale

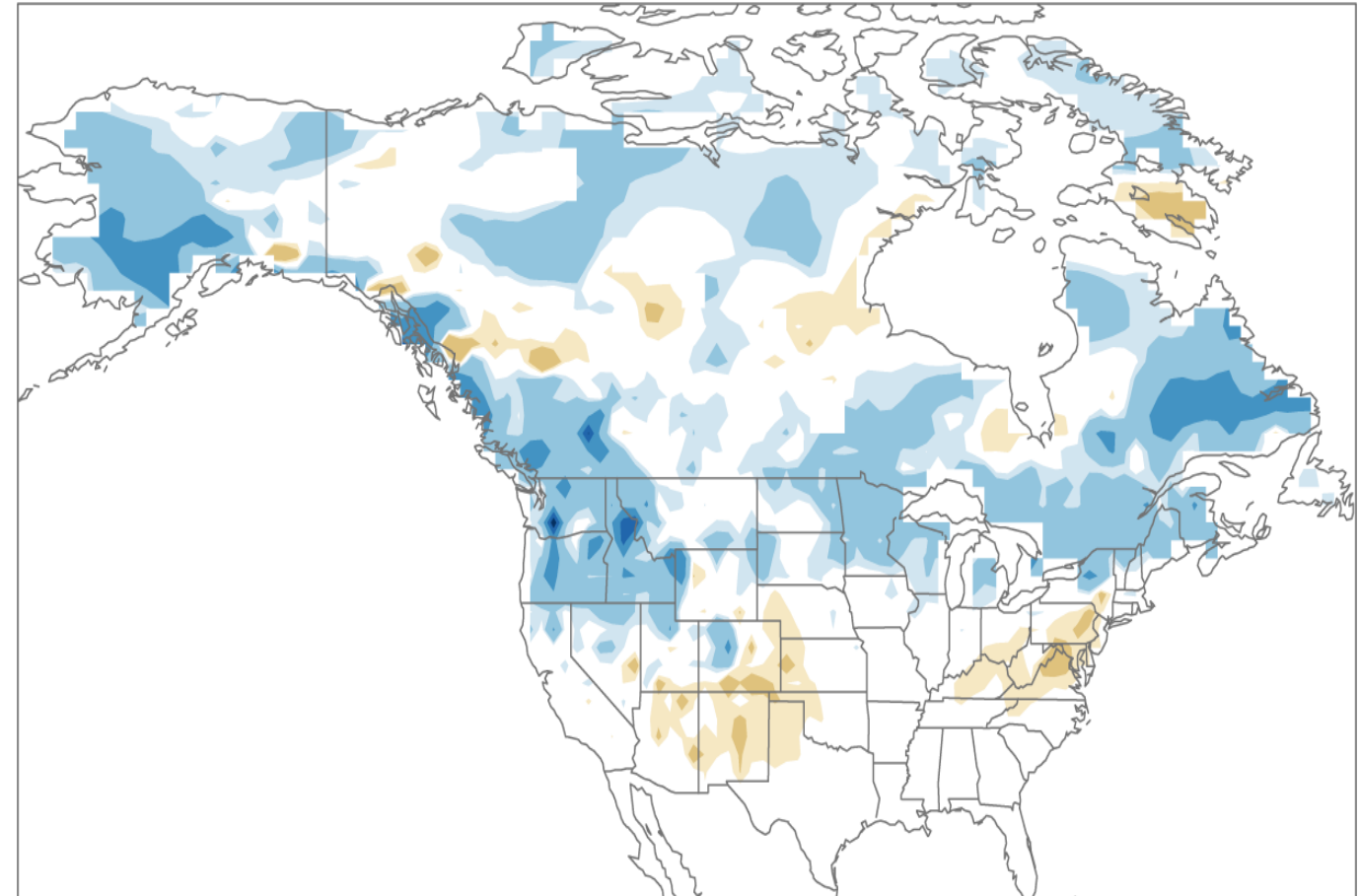


NOAA Winter 2021/22 Outlook

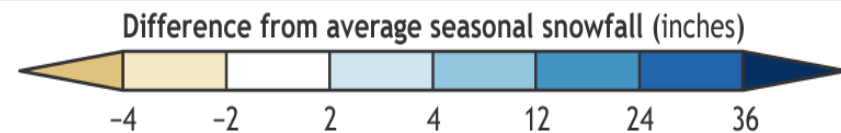
What About Snowfall?

- Arctic outbreaks, ice storms and snow storms are difficult to predict more than 1 to 2 weeks in advance. The frequency, number and intensity of these events cannot be predicted on a seasonal timescale.
- Snowfall tends to be highly variable during La Nina winters in our region, with a trend toward BELOW average snowfall.
- Major winter weather events have occurred during past La Nina winters
 - New Years Storm 1970/1971
 - Arctic outbreak of Jan 1985
 - Cold, snowy December 2010
 - Ice Storms of 2021

Average snowfall patterns for all La Niña years



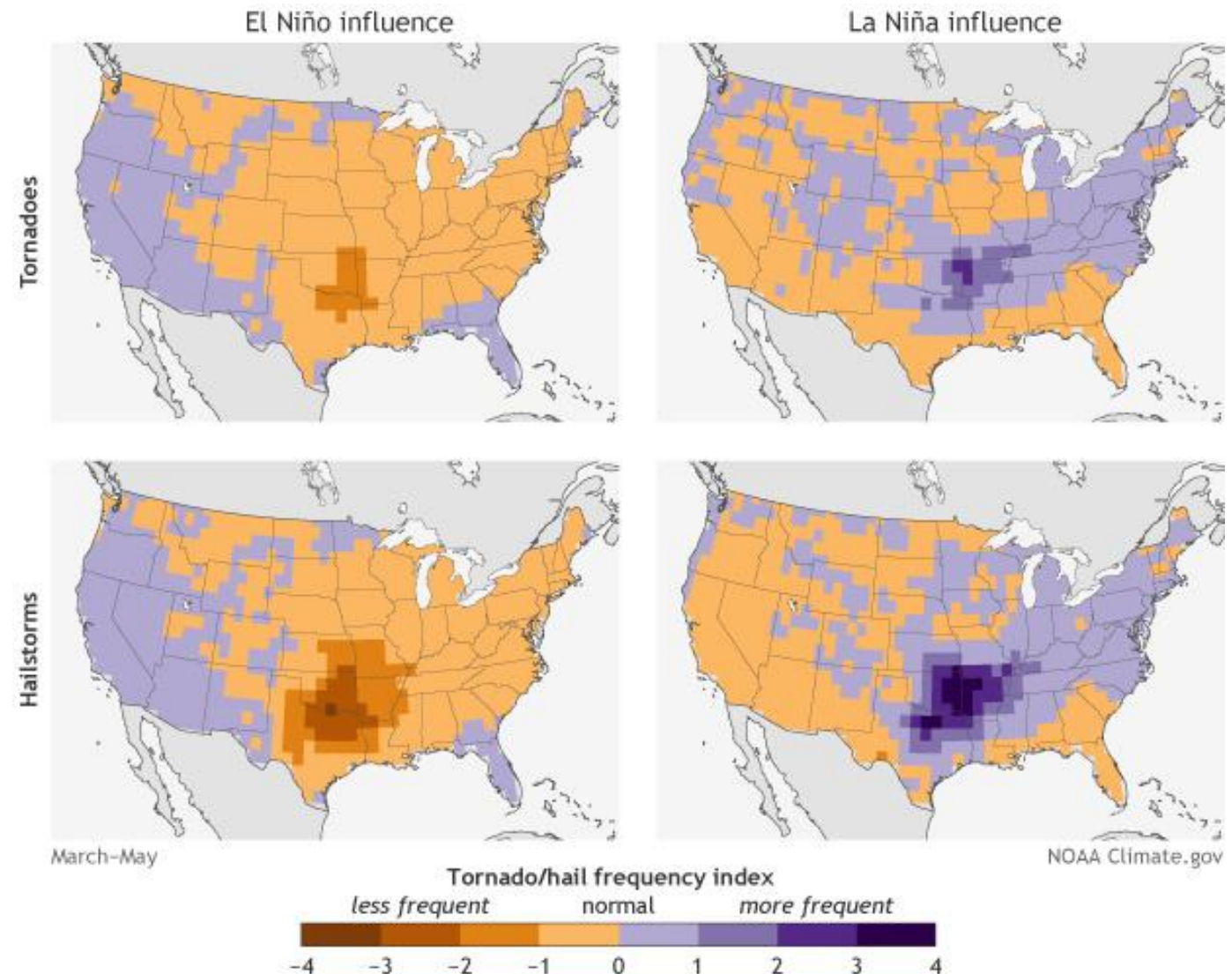
October-April
1950-51 to 2008-09



NOAA Climate.gov
Data: Rutgers GSL

NOAA Winter 2021/22 Outlook & Beyond

- Looking further out, there can be an increased probability of severe weather (hail and tornadoes) during the spring months following a La Nina winter.
- While increased probabilities are greatest in the southern Plains and lower Mississippi Valley, in general, springtime hailstorms and tornadoes are more frequent across the Ohio Valley and central Appalachians.



Instructions to be provided in follow-up email

- 1. Complete online form to become a registered weather spotter for NWS Charleston.**
- 2. After completing the online form, you will receive an email containing the Weather Spotter Hotline number. (This may take a couple of days, so be patient)**
- 3. Provide feedback on the training by following the link in the email. It's optional and anonymous but your feedback is very much appreciated!**



Thank You!

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